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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/886,213	06/22/2001	Yuji Matsuyama	210029US3DIV	7008

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EXAMINER

JOLLEY, KIRSTEN

ART UNIT PAPER NUMBER

1762

DATE MAILED: 05/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/886,213

Applicant(s)

MATSUYAMA ET AL.

Examiner

Kirsten C Jolley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-4, 6-8 and 25-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-4, 6-8 and 25-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION***Response to Arguments***

1. The 35 USC 102(e) rejections over the prior art of You et al. have been withdrawn in response to Applicant's filing of certified English translations of the priority documents. The claims are newly rejected over the prior art of Nakano et al. in view of Chizinsky for the reasons discussed below; for this reason, this action is made non-final.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 2-4, 6-8, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakano et al. (US 6,423,651) alone or in view of Haluska (US 5,380,567).

Nakano et al. discloses a method of applying an insulating film forming coating to a semiconductor substrate, followed by heating and curing the coating in an inert gas atmosphere (col. 10, lines 56-58). Specifically, Nakano et al. states "by heating and curing in an inert gas atmosphere, the insulating film forming solution is polymerized and cured without being mixed with oxygen" and "*at the time of polymerization and curing of the insulating film forming solution, the insulating film forming solution is not oxidized [emphasis added]*" (col. 6, lines 24-41). Nakano et al. does not specifically set forth that the oxygen concentration of a treatment atmosphere is lowered when a temperature of the substrate is lower than the temperature at which the coating solution oxidizes, or that the original oxygen concentration is returned after completion of the heat treatment. However, it would have been well within the skill of one having ordinary skill in the art to have first supplied inert gas into a heat treatment chamber followed by heating in the process of Nakano et al., and then delaying the introduction of atmospheric air into the chamber until after the temperature is lowered (after heat treatment) because Nakano et al. clearly teaches that an inert atmosphere is desired *when the curing and polymerization occurs* (i.e., at the high temperature). One skilled in the art would have recognized that if the inert gas is not introduced until after heating has started, or atmospheric air is introduced into the chamber prior to cooling the substrate, then some undesired oxidation of the coating will occur because there is at least some amount time that has elapsed when both the temperature is high and the atmosphere contains oxygen.

Alternatively, Nakano et al. is applied in view of Haluska. Haluska similarly teaches a desire to perform its heat treatment step in the absence of oxygen, using an inert gas atmosphere, to prevent oxidation of the substrate. Haluska discloses the sequential steps of placing the coated

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substrate in a convection oven, introducing a continuous flow of inert gas, then raising the temperature in the oven to the desired level and for the desired time (col. 5, lines 48-54). It would have been obvious to one having ordinary skill in the art to have performed the sequence of steps (i.e., first introducing inert gas followed by heating) taught by Haluska in the inert gas atmosphere heat treatment process of Nakano et al. in order to prevent any amount of undesired oxidation of Nakano et al.'s coating which is taught to occur when curing/polymerization takes place in an oxygen-containing atmosphere.

As to claims 3 and 6-8, the treatment atmosphere of a heat treatment apparatus would necessarily be returned to its original oxygen concentration when the chamber is opened and the substrate is removed therefrom.

As to claim 4, the coating material of Nakano et al. is organic.

5. Claims 25-27 and 29-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakano et al. alone or in view of Haluska as applied to claims 2-4 and 6-8 above, and further in view of Chizinsky (US 5,252,807).

Nakano et al. alone or in view of Haluska is applied for the reasons discussed above. Nakano et al. lacks the specific details of a heating unit in which its coating may be heated and cured. One having ordinary skill in the art would have been motivated to look to the prior art for a conventional heat treating apparatus which is capable of heating semiconductor wafers in an inert gas environment in which the heating step of its invention may be performed.

Chizinsky discloses a rapid thermal processor for heating semiconductor substrates. The apparatus of Chizinsky comprises a heated plate having support pins 60 therein to raise and

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lower the semiconductor wafers away from and towards the heater plate 30 (col. 5, lines 45-47). Chizinsky's apparatus also comprises a plurality of gas inlets and outlets to provide desired gaseous processing ambients (see claim 3), for example: delivery conduit 84 and nozzle 82 for supplying gaseous ambient, such as nitrogen (an inert gas), into the chamber (col. 6, lines 8-14 and Figure 3); or alternatively, Figure 2 illustrates inlet tube 104 which allows selected gas flow into the process chamber (col. 4, lines 56-63). It would have been obvious for one having ordinary skill in the art to have used the rapid thermal processor of Chizinsky in order to perform the heat treating step in the process of Nakano et al. with the expectation of success since Chizinsky's apparatus is for use with semiconductor wafers and because it comprises means to supply an inert gas atmosphere to the heat treatment chamber.

With respect to claims 25-27 and 29-33, the apparatus of Chizinsky is capable of first holding the substrate on support pins capable of appearing and disappearing from and into a heated plate for supporting the substrate apart from the heated plate at an initial stage of heat treating just after the substrate is delivered into the heating chamber and the chamber door is closed to start supplying the inert gas (see claim 1 and col. 7, lines 29-36). During the high temperature heating step, the pins are retracted into the heated plate and the substrate is held directly on the heated plate. Finally, Chizinsky teaches that the substrate is held in proximity to a cooled heat-absorbing surface on the lift pins, and then transferred to support surface 130 which also acts as a cooling plate while removing the substrate from the heating chamber.

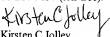
As to claims 34-36, the apparatus of Chizinsky additionally comprises a "cover" or gate 52 which seals the heat treatment chamber (col. 5, lines 36-44).

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten C Jolley whose telephone number is 571-272-1421. The examiner can normally be reached on Monday to Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck can be reached on 571-272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Kirsten C Jolley
Patent Examiner
Art Unit 1762

kcj